

PROJECT NUMBER: 6502
PROJECT TITLE: Environmental Tobacco Smoke
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I. ETS STUDIES

- A. **Objective:** Develop a method for determining the MS and SS deliveries of solanesol in cigarette smoke for use in the evaluation of solanesol as a marker for environmental tobacco smoke (ETS).
- B. **Results:** A SS chamber was made by John Bivins such that the top opening was designed to hold a normal Cambridge filter pad for collecting the SS TPM. The MS and SS TPM pads were extracted using toluene, derivatized using BSTFA and pyridine and analyzed using a 15 M, J&W DB5 capillary column connected to a flame ionization detector. The separation was obtained using a temperature program from 70°C to 300°C at 20°C/min with a final temperature hold of 15 minutes. The internal standard (octadecahydrosolanesol)¹ eluted at 18 minutes and solanesol eluted at 24 minutes. For Monitor 24 the deliveries obtained were: 420 to 510 µg/cigt MS and 130 to 180 µg/cigt SS for a SS/MS ratio of 0.3².
- C. **Conclusions:** Collection, derivatization, and gas chromatographic conditions have been defined in the procedures for measuring MS and SS solanesol. Sufficient resolution for solanesol and an internal standard have been obtained for MS and SS TPM of Monitor 24 cigarettes.
- D. **Plans:** Evaluations to determine the efficiency of collection and recovery studies with known levels of solanesol will be performed.
- E. **References:**
1. Izac, R., Personal Communication, January 17, 1989.
 2. Randolph, H., PM Notebook #8475, pp. 180-181.

II. MAINSTREAM AND SIDESTREAM SMOKE STUDIES

- A. **Objective:** Use the newly developed TDL procedures for the evaluation of MS methanol deliveries of different types of cigarettes.
- B. **Results:** The methanol delivery for the control MF blend (#6359) was 240 ± 40 µg/cigt (28 ± 3 µg/puff). The deliveries for the MF blend with standard casing (#6360) and the MF blend with standard casing and A/C (#6361) were 255 ± 18 µg/cigt (29 ± 2 µg/puff) and 260 ± 18 µg/cigt (29 ± 2 µg/puff), respectively.

C. Conclusions: Based on these samples, the MS methanol deliveries were not affected by the casing or A/C flavors applied to the MF blend.

D. Plans: MS methanol will be measured for the 100% single blend component cigarettes made in 1988.

E. References:

Lipscomb, J., PM Notebook #8703, p. 52.

A. Objective: Measure MS ammonia deliveries for ART experimental cigarettes.

B. Results: The ART feed control (X6D8DEJ) and the ART extracted filler (X6D8DEK) cigarettes were analyzed for MS total ammonia with the filter plug removed and the ventilation holes taped. The deliveries were 60 ± 15 and 130 ± 20 $\mu\text{g}/\text{cigt}$, respectively. Monitor 24 cigarettes analyzed in similar fashion delivered 56 $\mu\text{g}/\text{cigt}$ compared to 30 $\mu\text{g}/\text{cigt}$ when smoked with filter intact. These samples also were used to determine the MS total ammonia delivery for the eighth puff only. Four cigarettes were smoked with filter intact into the solvent trap to obtain sufficient sample. The eighth puff delivery was 5 $\mu\text{g}/\text{puff}$ for the feed control (X6D8DEJ) and 14 $\mu\text{g}/\text{puff}$ for the ART extracted filler (X6D8DEK)¹.

C. Conclusions: The level of ammonia in the eighth puff of the cigarettes made from ART extracted filler approaches the 17 to 22 $\mu\text{g}/\text{puff}$ threshold previously determined using E-55 Bright cigarettes². Serious consideration should be given to reduce the ammonia delivery in the ART cigarettes.

D. Plans: The ART cigarettes will be analyzed again with the filters intact so that comparisons can be made with other samples being smoked using normal procedures. Lactic acid has been suggested as a means for lowering the filler pH and reduce the ammonia delivery. These experiments are being conducted using various levels of lactic acid³.

E. References:

1. White, G. and H. Randolph, "Mainstream Ammonia in ART/DIET and ART Feed Filler," memo to B. Handy, January 3, 1989.
2. Parrish, M., Harward, C. and G. Vilcins, "Determination of the Gaseous Ammonia Threshold in Cigarettes Smoke, Part I, Analytical Methodology," Completion Report, June 7, 1985, Acc. No. 85-175.
3. Parrish, M., PM Notebook #8729, pp. 17-19.